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PATENT  
Docket No. 49933US032IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): HOOPMAN et al. ) Group Art Unit: 1722  
Serial No.: 09/955,604 ) Examiner: Joseph S. Del Sole  
Confirmation No.: 1214 )  
Filed: 19 September 2001 )  
For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

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**REPLY BRIEF**

**Mail Stop Appeal Brief - Patents**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Appellants received the Examiner's Answer in connection with the appeal of the final rejections in the above identified application and have the following remarks for consideration by the Board in their review of the rejections. Appellants continue to request that the Board reverse the rejections of the pending claims as discussed in the Appeal Brief filed October 3, 2005.

**Claims 23, 24, 30-32, 89, 90, 92, 93, 134-136, 138-143, and 145-148 are not obvious under 35 U.S.C. 103(a) over *Pieper et al.* (U.S. Patent No. 5,152,917) in view of *Rochlis* (U.S. Patent No. 3,312,583) and either *Larson et al.* (U.S. Patent No. 4,903,440) or *Bloecher et al.* (U.S. Patent No. 4,799,939).**

As discussed in the Appeal Brief submitted by Appellants, the modification of *Pieper et al.* to include differently shaped cavities as discussed in secondary references (*Rochlis*, *Larson et al.* and *Bloecher et al.*) fails to meet the requirements for a legally sufficient case of *prima facie* obviousness for claims 23, 24, 30-32, 89, 90, 92, 93, 134-136, 138-143, and 145-148 because the

## Reply Brief

Page 2 of 7

Serial No.: 09/955.604

Confirmation No.: 1214

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proposed modification would render the invention of *Pieper et al.* unsatisfactory for its intended purpose.

The inventions described in *Pieper et al.* were developed because the prior art abrasive articles "lack a high degree of consistency. If the abrasive article is made via a conventional process, the adhesive or binder system can flow before or during curing, thereby adversely affecting product consistency." *Pieper et al.*, col. 1, lines 57-61. To address the problems of inconsistency, *Pieper et al.* describe abrasive articles and tools for making the abrasive articles that provide consistency or uniformity. "The more consistent an abrasive article of this invention, the more consistent will be the finish imparted by the abrasive article to the workpiece. An abrasive article having an ordered profile has a high level of consistency, since the height of the peaks of the abrasive composites will normally not vary by more than 10%." *Id.* at col. 7, lines 63-68. In other words, *Pieper et al.* teaches that consistency and uniformity are the objectives in the abrasive articles (and, therefore, the tools used to manufacture them). This interpretation is strengthened by a review of the figures of *Pieper et al.*, all of which depict consistent, uniform abrasive articles/tools (except for those depicting the prior art).

To support the asserted *prima facie* case of obviousness, it is asserted that one of ordinary skill in the art would introduce the inconsistencies of the secondary references into the *Pieper et al.* inventions. Appellants' brief indicated that the proposed modifications would render *Pieper et al.* unsatisfactory for its intended purpose given the focus of *Pieper et al.* on providing abrasive articles that are consistent and uniform.

In the Examiner's Answer, it is asserted that "[t]he lack of consistency being avoided by Pieper does not coincide with the 'inconsistency' of the shapes taught by Rochlis." *Examiner's Answer*, p. 10 (November 9, 2005). It is also asserted that "[s]uch combination does not destroy Pieper, but rather enables the article of Pieper to have more varied abilities due to an almost infinite number of specifically different physical characteristics." *Id.* As support for those

**Reply Brief**

Serial No.: 09/955.604

Confirmation No.: 1214

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Page 3 of 7

assertions, a portion of *Pieper et al.* is cited to show that "Pieper teaches that the surface can have varied shapes such as at col 7, lines 4-15 and col 8, lines 15-25." *Id.*

Appellants respectfully disagree that these assertions find support in the cited references to the degree required to support a *prima facie* obviousness rejection. To demonstrate, the cited passages of *Pieper et al.* are reproduced below.

When the graph of one region of the article is compared to a graph of another region of the article, the amplitude and frequency of the output will essentially be the same, meaning that there is no random pattern, i.e., a very clear and definite repeating pattern is present.

The shapes of the abrasive composites repeat themselves at a certain periodicity. Typically, abrasive composites have a high peak (i.e., region) and a low peak (i.e., region). The high peak values from the data analyzer are within 10% of each other and the low peak values from the data analyzer are within 10% of each other.

*Pieper et al.*, col. 7, lines 4-15.

... surface finish over the life of the product.

Abrasive composites disposed in a predetermined array can range through a wide variety of shapes and periods. FIGS. 4 and 5 show linear curved grooves. FIGS. 6 and 7 show pyramidal shapes. FIGS. 8 and 9 show linear grooves. FIG. 1 shows projections 14 of like size and shape and illustrates a structured surface made up of trihedral prism elements. FIG. 3 shows a series of steps 31 and lands 32.

Each composite has a boundary, which is defined by one or more planar surfaces. For example, in FIG. 1 the ....

*Pieper et al.*, col. 8, lines 15-25.

Although these passages are cited as support for the assertion that Piper et al. teaches variations in shape within a given abrasive article, an analysis shows that no such support is

## Reply Brief

Page 4 of 7

Serial No.: 09/955,604

Confirmation No.: 1214

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For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

provided. For example, although the second cited passage identifies a variety of different shapes in the figures, it is instructive to note that within each abrasive article, the shapes are essentially identical. In other words, each different figure depicts a single abrasive article in which the structures are uniform and consistent – none of the figures depicts an abrasive article that includes differently shaped abrasive structures.

As a result, any assertion that *Pieper et al.* itself "teaches that the surface can have varied shapes" is not supported by the reference itself and must be disregarded.

Furthermore, it is the uniformity and consistency of the abrasive articles of *Pieper et al.* that serve as the basis for the variety of advantages that the abrasive articles of *Pieper et al.* provide.

Each region of peaks or shapes will, however, have essentially the same geometry as another region of peaks or shapes. Thus, for a given digitized profile in one region of peaks or shapes, another digitized profile can be found in another region of peaks or shapes that is essentially the same as that of the first region.

The more consistent an abrasive article of this invention, the more consistent will be the finish imparted by the abrasive article to the workpiece. An abrasive article having an ordered profile has a high level of consistency, since the height of the peaks of the abrasive composites will normally not vary by more than 10%.

**Reply Brief**

Serial No.: 09/955,604

Confirmation No.: 1214

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For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

Page 5 of 7

The coated abrasive article of this invention displays several advantages over coated abrasive articles of the prior art. In some cases, the abrasive articles have a longer life than abrasive articles not having abrasive composites positioned according to a predetermined array. The spaces between the composites provide means for escape of the swarf from the abrasive article, thereby reducing loading and the amount of heat built up during use. Additionally, the coated abrasive article of this invention can exhibit uniform wear and uniform grinding forces over its surface. As the abrasive article is used, abrasive grains are sloughed off and new abrasive grains are exposed, resulting in an abrasive product having a long life, high sustained cut rate, and consistent surface finish over the life of the product.

*Pieper et al.*, col. 7, line 55 to col. 8, line 15 (emphasis added).

The asserted motivation to make the proposed modifications to *Pieper et al.* in view of *Rochlis* and further in view of either *Larson et al.* or *Bloecher et al.* is insufficient because the asserted advantages are already provided by the abrasive articles of *Pieper et al.*. As a result, one of ordinary skill in the art would find no motivation to make the proposed modifications.

For example, it is asserted in the Examiner's Answer that motivation to make the proposed modifications would be found "because such variations [in shapes] achieve a high rate of cut and optimize cut rate, life of the abrasive article and surface finish on the workpiece as well as improve grinding performance." *Examiner's Answer*, p. 7 (November 9, 2005). Those advantages are, however, already attributed to the uniformity and consistency found in the abrasive articles of *Pieper et al.* as shown by the underlined portions in the passage of *Pieper et al.* reproduced above.

Because *Pieper et al.* teaches that its uniform and consistent abrasive articles already possess the advantages that are asserted to motivate one of ordinary skill in the art to modify the abrasive articles of *Pieper et al.* to reach the claimed invention, the asserted motivation or desirability to make the proposed modifications cannot be supported by the references themselves. Although it may be possible to make the proposed modifications, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious

**Reply Brief**

Serial No.: 09/955,604

Confirmation No.: 1214

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For: TOOLS TO MANUFACTURE ABRASIVE ARTICLES

Page 6 of 7

unless the prior art also suggests the desirability of the combination." MPEP § 2143.01(III), p. 2100-137, 8<sup>th</sup> Ed., Rev. 3 (August 2005) (emphasis in original) (citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)).

Furthermore, the assertion set forth in the Examiner's Answer that the introduction of different shapes into the abrasive articles of *Pieper et al.* "does not destroy Pieper, but rather enables the article of Pieper to have more varied abilities due to an almost infinite number of specifically different physical characteristics" finds no support in the cited references and should be disregarded as mere supposition or conjecture that is not based on any teachings found in the cited art.

For at least the above reasons, Appellants respectfully submit that the rejection of claims 20, 21, 25-28, 33-54, 94-96, and 98-111 over *Pieper et al.* in view of *Rochlis*, and further in view of either *Larson et al.* or *Bloecher et al.* does not meet the requirements for a *prima facie* case of obviousness.

## Reply Brief

Page 7 of 7

Serial No.: 09/955.604

Confirmation No.: 1214

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**SUMMARY**


For at least the reasons presented herein and in the Appeal Brief submitted earlier, Appellants respectfully request that the Board review and reverse the rejection of claims 23, 24, 30-32, 89, 90, 92, 93, 134-136, 138-143, and 145-148 as discussed herein, and that notification of the allowance of these claims be issued.

Respectfully submitted by

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09 January 2006

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By: Name: Rachel Gagliardi-Gebhardt